CLARITY

VIEWER USER MANUAL

iCRco

Digital Imaging Made Simple.™

Foreword

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Clarity Viewer Information

Please Enter the details of the Clarity Viewer system here:

Serial Number: _____

Date Purchased: _____

Interface Type: USB 2.0

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Safety Information

Read and understand the installation and operating instructions before starting the Clarity Viewer.

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Revision History

Revision	Author	Date	Notes
A	MS	2009-04-06	Initial Release
B	MS	2010-03-03	Updated with 1.3 features
C	MS	2010-07-08	Added CE and FDA approval label
D	MS	2010-10-05	Updated with 1.4 features
E	MS	2011-03-09	Updated minimum computer requirements

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1. Introduction

1.1 Overview

Clarity is an easy to maintain, scalable, digital image and information management solution. Clarity provides secure HIPPA-compliant image management and display for medical imaging modalities including, for example, Computed Radiography (CR), Magnetic Resonance (MR), Computed Tomography (CT) and Ultrasound (US). The Clarity Archive provides DICOM services including DICOM storage, DICOM routing, and DICOM Modality Work List for patient information systems. The Clarity Archive also includes integration with most existing RIS and HIS systems. The Clarity Archive also supports the HL-7 protocol allowing integration with many EMR systems.

The Clarity Viewer is a multi-modality image viewer designed to provide rapid and easy access to medical images. Multiple monitors are automatically detected and easily configured. An integrated Work List provides flexible search options such as filtering by patient ID, accession number, study ID, modality, study status, and many more. The Clarity Viewer provides robust and easy-to-use image manipulation and annotation tools including support for CR, DR, and cross-sectional imaging (e.g., US, CT & MR modalities).

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2. Setup and Configuration

2.1 Local System Configuration

Minimum Viewing Workstation Configuration:

CPU: 2 GHz Core2Duo
System RAM: 2 GB
Hard Drive: 200 GB
Graphics Card: 1280 x 1024/32-bit color capable graphics card
Monitor: High-contrast diagnostic quality monitor (two monitors recommended)
Operating System: Windows XP Pro SP2c with .NET 4.0 or Windows 7 with .NET 4.0
Java: Version 6 Update 14

Domain Configuration:

Note The User may access Clarity Viewer using a domain name, but the network must be properly configured. Please contact your system administrator to assign a domain name to the Clarity Viewer.

Any Workstations wishing to access the Clarity Viewer via a domain name must be configured on the same Windows domain as the Archive. Domain misconfiguration may result in a non-functioning Clarity Viewer.

Firewall Configuration:

Workstations wishing to use the Clarity Viewer or DICOM Send and Query/Retrieve to the Clarity Archive need to have TCP ports 104 (DICOM), 8443 (Clarity launch page SSL port), and 11112 (Clarity Archive port) and UDP port 137 (data transfer) open in the Windows firewall and any third party hard and/or software firewalls running on the network.

2.2 Updates

When a new version of the Clarity Viewer has been deployed to the Clarity server, the Clarity Viewer software will automatically update itself from the Clarity server onto the Workstation on the next launch.

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2.3 Launching the Clarity Viewer

2.3.1 Initial Installation and Launch of Clarity Viewer

1. Go to the *Start menu* → *Programs* → *Mozilla Firefox* to launch the Firefox web browser.
2. In Firefox's address bar, enter *https://IPADDRESS:8443/icrco-viewer* where *IPADDRESS* is the IP address of the Clarity Archive.
3. Click the *Launch* link to start the Clarity Viewer.
4. The dialog box *Opening launch.jnlp* will appear. Make sure the *Open with* radio dialog is selected and the drop-down box next to it says *Java Web Start Launcher*. Click **OK** to continue.
   Note You will have to click **Yes** to trust Windows XP unsigned content.
5. The Clarity Viewer will open and display a login dialog.
   Note This process will only need to occur once on each workstation. After the initial installation of the Viewer, a shortcut will be placed on the desktop.

2.3.2 Quick Launch of Clarity Viewer

After the initial installation of the Clarity Viewer, a shortcut to the application is placed on the User's desktop. To launch the Clarity Viewer, simply double mouse click on the desktop shortcut.

Note If the desktop icon disappears, the User should clear the Java cache, as described in Section A.1, then reinstall the Viewer, as described in Section 2.3.1.

2.4 Logging In

After launching, the Clarity Viewer will open and present a login dialog box. Enter a User name and password, then click **OK** to continue.

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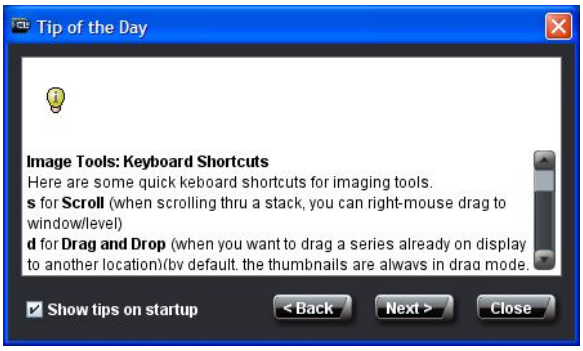
Note If you do not have a User name and password, please contact your System Administrator.

2.5 Tips

The Clarity Viewer will display a Tip of the Day when the application is started. The Tip of the Day gives the User helpful information to make using the Clarity Viewer easier.


Tip of the Day
Image Tools: Keyboard Shortcuts
Here are some quick keboard shortcuts for imaging tools.
s for Scroll (when scrolling thru a stack, you can right-mouse drag to window/level)
d for Drag and Drop (when you want to drag a series already on display to another location)(by default, the thumbnails are always in drag mode.
Show tips on startup
< Back
Next >
Close

The User can use the *Previous Tip* & *Next Tip* to display more tips.

The *Close* button will close the Tip of the Day dialog box.

The User can disable the Tip of the Day by unchecking the *Show Tips on Startup* box.

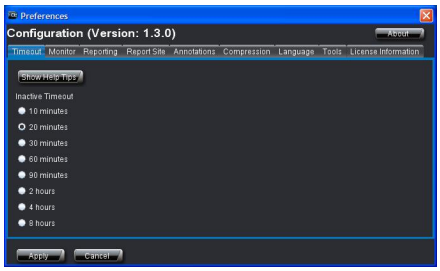
To re-enable the Tip of the Day, see Section 2.6.1 on page 4.

2.6 Preferences

The preferences can be accessed by clicking on the **Configuration** button, located in the upper, right-hand corner of the Work List window. Clicking the **Configuration** button will cause the *Preferences* dialog to pop-up.

2.6.1 Time Out

The Inactive Timeout preference allows the User to specify the length of time before the Clarity Viewer automatically logs out. To set the Inactive Time, right mouse click in the Work List, then select *Preferences* → *Inactive Timeout*, then select the desired length of time. The default duration is 20 minutes.



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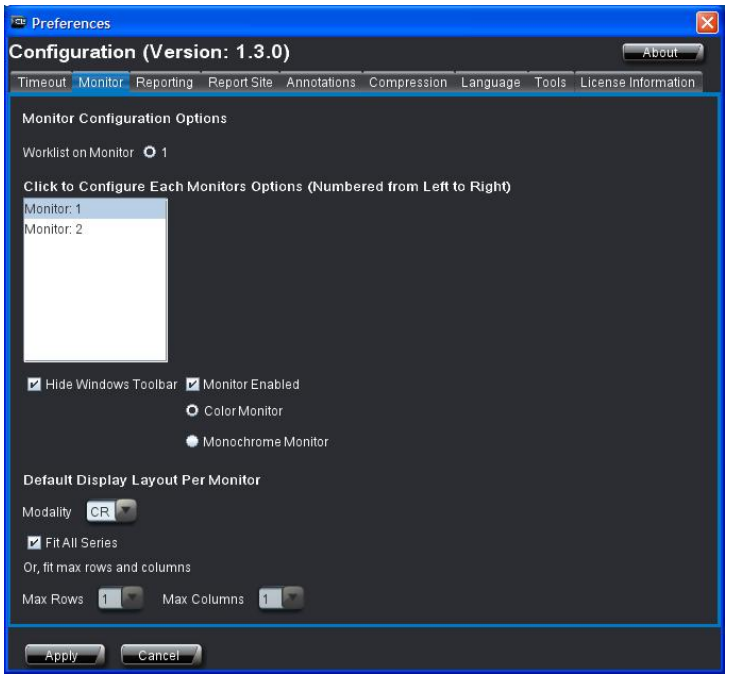
2.6.2 Monitor Configuration Options

The monitor preferences can be accessed by clicking on the **Configuration** button. This will bring up the *Preferences* dialog. From there, click the *Monitor* tab.

From the *Preferences* dialog, the User can configure each monitor attached to the computer. The monitors are numbered according to their Windows device configuration.



Note Changing monitor preferences will require a restart of the Clarity Viewer for the changes to take effect. The application will **not** restart on its own. The User will need to restart the application manually.

Work List on Monitor:

The User may select which monitor the Clarity Viewer displays the Work List on. This is achieved by selecting the radio dialog check box to the left of the desired monitor. Click the **Apply** button to save the changes, then restart the Clarity Viewer for the changes to take effect.

Monitor Configuration

The steps to configure a monitor are as follows:

1. Select the desired monitor from the monitor selection box.
2. If the monitor is not enabled, check the *Monitor Enabled* box.
3. Select if the monitor is Color or Monochrome (the default is color).
4. Click **Apply**.
5. Quit and relaunch the Clarity Viewer for the changes to take effect.

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Hide Windows Tool bar

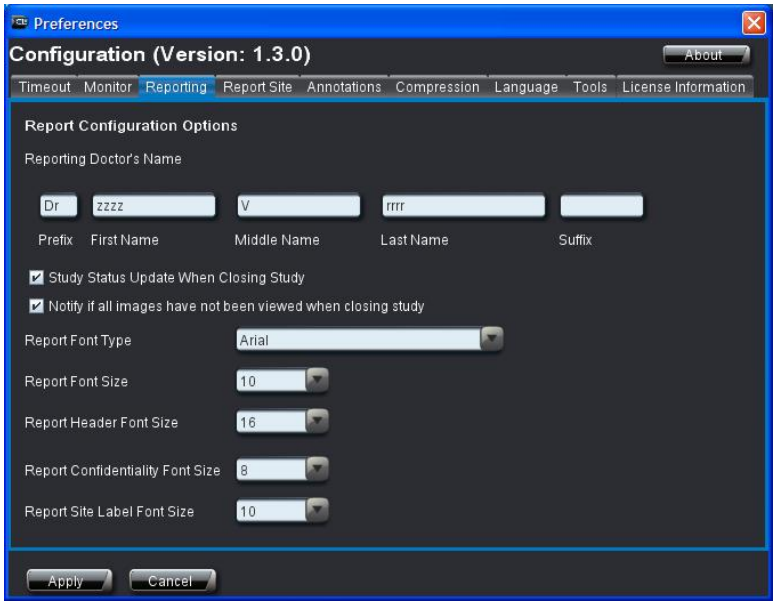
The User can choose whether to show or hide the Windows tool bar by checking or unchecking the preference check box. The check box is located directly below the monitor selection box. Selecting the check box will hide the Windows tool bar. If this check box is not selected, then the Windows tool bar will be displayed.

2.6.3 Default Display Layout Per Monitor

The User can choose, on a per modality basis, how series of images are laid out on screen. If the *Fit All Series* box is checked, the Clarity Viewer will display every series from the selected patient on the screen. If the *Fit All Series* box is not checked, the user may choose the maximum number of rows and columns of series of images to display.

2.6.4 Reporting Options

The Reporting preferences can be accessed by clicking on the **Configuration** button. This will bring up the *Preferences* dialog. From there, click the *Reporting* tab.



Reporting Doctors Name

In the *Report Writer* tab, the User may set the name of the physician that will appear in the report.

Note This is a per User setting. Each User can have their own name to appear in the report. Only Users with the user privileges of "doctor" can write reports. Please see the Clarity

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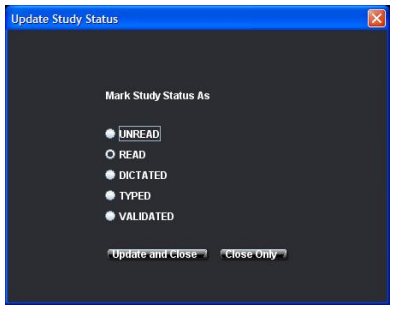
Configuration & Troubleshooting Manual for more information on creating new users and setting user privileges.

Study Status Update When Closing Study

When this option is checked, upon closing an image from the *Viewer*, a dialog box will appear asking the User to update the *Study Status*:

Figure 2.1: The Update Study Status dialog pops-up after closing a study in the Viewer window.



This option works in conjunction with the Filter Modifiers and Study Status workflow options present in the Work List window.

Options:
Update and Close: Updates the study status to the selected value, e.g., "Read," then closes the study.
Close Only: Closes the study without changing the study status.

If a report is written with the option enabled, upon clicking the *Create* button, the report will be generated, the current patient will close, the study status will be set to *Validated* and the next patient in the worklist will be selected.

Notify if all studies have not been viewed

When this option is checked, if all images in the initially study have not been viewed, the Clarity Viewer will display a warning dialog notifying the User.

Report Font Type

The User may configure the body text font face used when writing reports in the Clarity Viewer. Select the desired font from the drop-down menu. Click the **Apply** button to save the changes.

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Report Fonts Size

The User may configure the body text font size used when writing reports in the Clarity Viewer. Select the desired font size from the drop-down menu. Click the **Apply** button to save the changes.

Report Header Font Size

The User may configure the header text font size used when writing reports in the Clarity Viewer. Select the desired font size from the drop-down menu. Click the **Apply** button to save the changes.

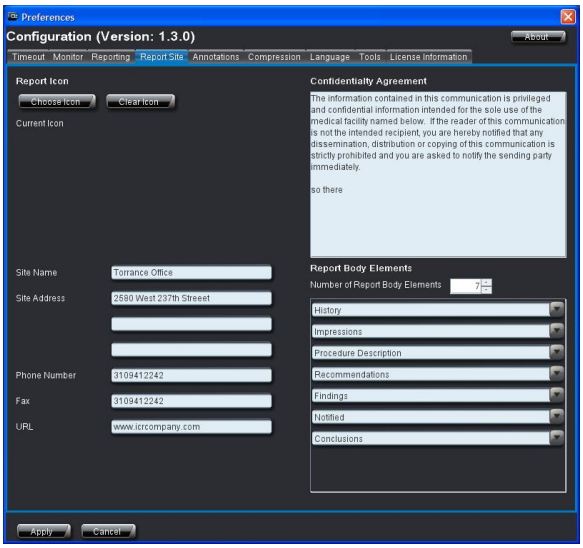
Report Confidentiality Font Size

The User may configure the Report Confidentiality text font size used when writing reports in the Clarity Viewer. Select the desired font size from the drop-down menu. Click the **Apply** button to save the changes.

Report Site Label Font Size

The User may configure the Report Site Label text font size used when writing reports in the Clarity Viewer. Select the desired font size from the drop-down menu. Click the **Apply** button to save the changes.

2.6.5 Report Site Options



Report Icon

Clicking the **Choose Icon** button will allow the User to select a JPEG, GIF, or PNG file of the practice or site logo to be placed in the report header. Clicking the **Choose Icon** button will bring up a file upload dialog from which the User may select the site logo. After selecting the desired graphic, click the **Save** button to save the icon.

The **Clear Icon** button removes the current icon, allowing for the upload of a new icon.

Current Icon

Displays a preview of the current icon that is displayed in the Report header.

Site Name

Enter the Site or Practice name in the text field.

Site Address

Enter the Site or Practice address in the text field.

Phone Number

Enter the Site or Practice phone number in the text field.

Fax

Enter the Site or Practice fax number in the text field.

URL

Enter the Site or Practice web site address in the text field. For example: `http://www.icrcompany.com`.

Confidentiality Agreement

Enter the Site or Practice confidentiality agreement text in the text field.

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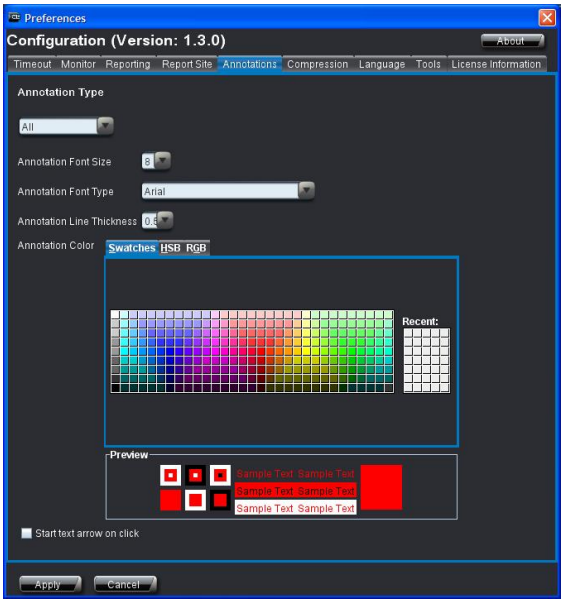
Report Body Elements

The *Report Body Elements* allows the User to customize the elements in a Report. Each element can only appear once in a report (an *element* is Impressions, Findings, Procedure Description, Conclusions, etc.). Select the number of elements to appear in a report in the **Number of Report Body Elements** box, then select the heading for each element (For example, Impressions, Findings, Conclusions, etc).

2.6.6 Annotation Options

The Annotation Options allow the User to set the font, font color and size, annotation line thickness, and annotation color. The User may apply these options to all annotations at once (by selecting *All* from the *Annotation Type* drop-down menu), or the User may select the type of annotation, and set the parameters individually for each annotation type.



Annotation Type:

Using the *Annotation Type* drop-down menu allows the User to select configuration parameters for each individual annotation tool, or set the parameters for all tools at once (select *All* in the *Annotation Type* drop-down menu).

Annotation Font Size:

Allows the User to select the font size for annotations using text. The User may choose a font size between eight (8) and twenty (20) points.

Annotation Font Type:

Allows the User to select any font installed on the operating system to display annotations using text.

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Annotation Line Thickness:

Allows the User to select a value between one-half (0.5) and four (4.0) for the thickness of the annotation lines.

Annotation Color:

Allows the User to select the color for the annotation lines and text. The User may select from swatches (commonly used, pre-defined colors) by clicking on a swatch color, HSB (**H**ue, **S**aturation, and **B**rightness) by selecting a point somewhere in the colored square, or RGB (**R**ed, **G**reen, and **B**lue) by adjusting the sliders to the desired result.

Preview:

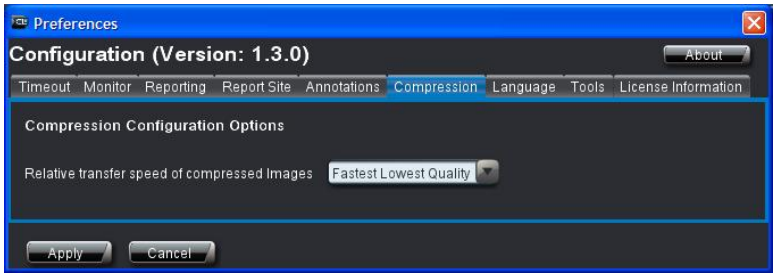
The *Preview* box will preview the selected colors, so the User may see how it looks before saving the preferences.

Start text arrow on click:

When this box is unchecked, drawing an arrow annotation begins with the end of the arrow. When the box is checked, drawing an arrow annotation begins with the arrow head.

2.6.7 Compression Options

The Compression options can be accessed by clicking on the **Configuration** button. This will bring up the *Preferences* dialog. From there, click the *Compression* tab.



The JPEG image format is used in the Clarity Viewer for displaying thumbnails and image pre-loading. The User can set the level of JPEG compression used in the transmission of the initial image over low bandwidth networks, such as a teleradiology connection. The default compression level is set to *Fastest*. The User has five (5) levels of compression to choose from. Setting the JPEG compression lower (faster) will increase the level of JPEG compression, making the file size smaller with less quality and allowing the initial image to load quicker over a low bandwidth network. Setting the JPEG compression higher (slower) will decrease the level of JPEG compression, making the file size larger with better image quality. Choose the setting appropriate for your network settings.

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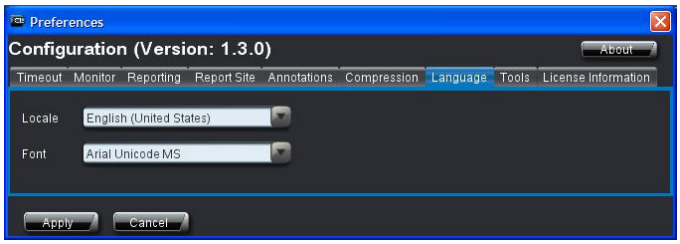
2.6.8 Language Options

The Language options can be accessed by clicking on the **Configuration** button. This will bring up the *Preferences* dialog. From there, click the *Language* tab.



Locale:

Setting the locale will set the language, text orientation (left to right or right to left), and date & time for the given region. Currently supported locales are: US English, Spanish, Thai, Chinese, and Hindi.

Font:

The font option allows the User to select the font face for the application. This includes the font face for the Work List and all dialog boxes inside the Clarity Viewer application, but does not include annotation fonts which are set separately in the *Annotations* tab. See Section 2.6.6 for more information on setting Annotation fonts.

2.6.9 Tools Options

The Tools options can be accessed by clicking on the **Configuration** button. This will bring up the *Preferences* dialog. From there, click the *Tools* tab.

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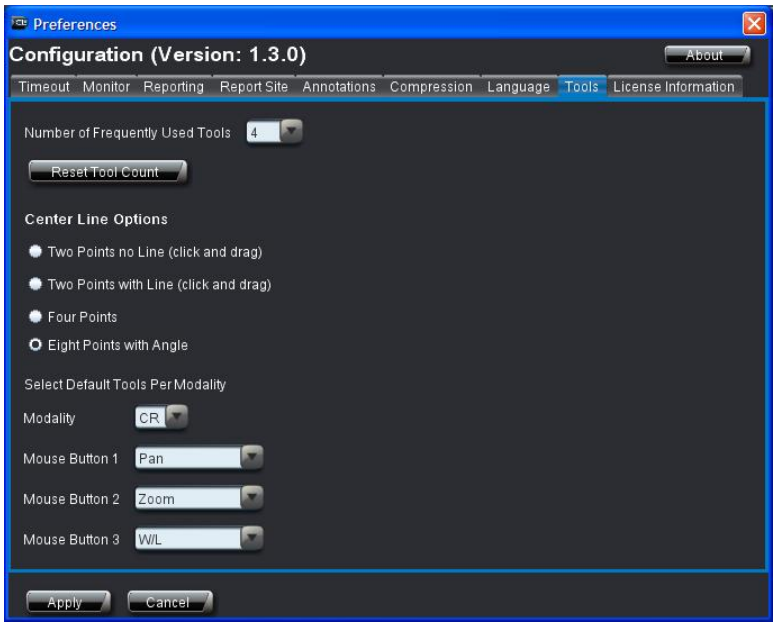

Number of Frequently Used Tools:

The Number of Frequently Used Tools option allows the User to set the number of frequently used tools that appear in the bottom of the tool bar when manipulating and annotating images. The use may select between one (1) and five (5) frequently used tools.

Reset Tool Count:

Clicking the **Reset Tool Count** button will clear the frequently used tools, and re-populate the frequently used tools section in the tool bar as the User begins using the image manipulation and annotation tools again.

Center Line Options:

The Center Line tool has four different drawing options. The options are: Two Points without Line, Two Points with Line, Four Points, or Eight Points with Angle. Please see Section 3.7.6 for the differences between each Center Line option.

Select Default Tools Per Modality

Selecting the default tools per modality allows the User to over-ride the default mouse button mapping described in Section 3.4.3. First select the desired modality, then choose the desired mouse button mapping. For example, for the CT modality, the user may want to

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map Cine Forward to the left mouse button, Scroll to the middle mouse button, and Zoom to the right mouse button.

2.6.10 License Information

This tab will display the software serial number, sales order number, number of modality inputs, number of LAN and Web viewers, and enabled Clarity modules. This information is especially important when contacting Technical Support.

2.6.11 About

The About This Software dialog can be accessed by clicking on the **Configuration** button. This will bring up the *Preferences* dialog. From there, click the **About** button. The About button will pop-up the End User License Agreement for the Clarity Viewer application.

2.7 Logging Out & Quitting

To log out of the Clarity Viewer, click the **Log Out**

button, located in the upper, right-hand corner of the Work List window. Logging out of the Viewer leaves the application open, but will require the User to enter a name and password to be able to access data again.

To quit the Clarity Viewer, click the **Quit**

button, located in the lower, right-hand corner of the Work List window. Quitting the Viewer means the User will have to re-open the application to access data again.

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3. Operation and Usage

3.1 Workflow Controls

Note Workflow control buttons may appear grayed out a certain times. A grayed out Workflow button means that the User may not use the button's function at the present time (e.g., when exporting images, the Clarity Viewer can not be quit, thus the quit button is grayed out).

3.1.1 Work List

The Work List button

returns the User to the Work List window.

3.1.2 Viewer

The Viewer button

returns the User to the Image Viewing window.

3.1.3 Save Study

Note For more information on the Save Study function, please see Section 3.12.

From the Work List: Clicking the **Save Study** button

with patients selected in the Work List with bring up the DICOM Send dialog. From the DICOM Send dialog, the User may DICOM send the studies to a different target, and configure new targets.

From the Image Viewing Window: Clicking the **Save Study** button

while in the Viewer allows the User to save image manipulation settings (sans Pan and Zoom settings) and annotations. The User may save multiple different sets of annotations on the same image.

3.1.4 Write CD

The Write CD button

opens the dialog to export the selected studies and images to a CD/DVD. See Section 3.11 for instructions on how to burn a CD/DVD or export the images to a local file system.

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3.1.5 Print

The Print button

opens the current image(s) with the DICOM print application.

3.1.6 Quit

The Quit button

exits & closes the Clarity Viewer.

3.2 Search

3.2.1 Search Keys

The Search Keys, located in the upper, left-hand corner, allow the User to search by patient last name, patient ID, accession number, or study ID. Select one of these from the *Search By* drop-down menu, and then enter the search criteria in the *Search For* box below. As soon as the User begins typing, the results of the search will appear in the *Patient / Study Search Results* Work List, located near the middle of the screen.

3.2.2 Search Filters

Search Filters are used in conjunction with Search Keys to help narrow the results of a search. The Search Filters can filter by study status, modality, facility name, date, and/or referring physician.

Filter Presets

Filter Presets are user-defined, allowing the User to define an optimal workflow. The Filter Presets can be accessed in a drop-down menu in the upper left part of the Search Filters

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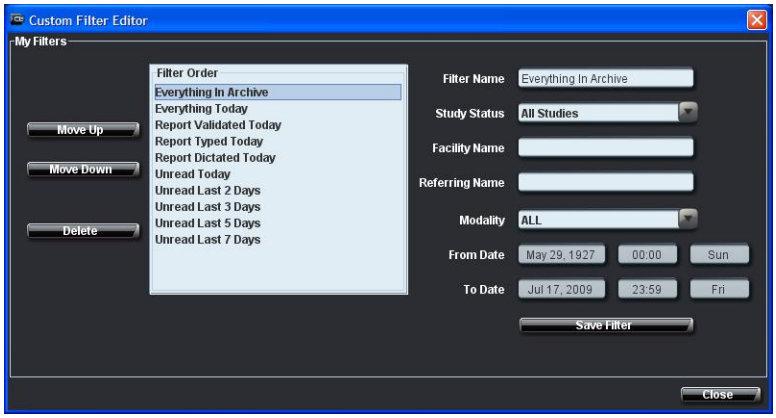
box. Clicking the drop-down menu will reveal a list of the default Search Filters.

Creating and Editing Filter Presets

The User can edit & define new Filter Presets by clicking on the *Manage Filters* button.



Note The default filters cannot be modified.

New Filter Preset:

1. From the *Work List* Window, click **Manage Filters**.
2. Enter the desired filter name in the *Filter Name* text box. Make sure the new name is not already entered as a filter name.
3. Enter the desired filter criteria. The User does not have to fill in all filter criteria, e.g., if the User desired a filter for all CR studies, then select the modality from the *Modality* drop-down menu, and select the date ranges.
4. Click the **Save Filter** button.

Editing a Filter Preset:

1. From the *Work List* Window, click **Manage Filters**.
2. Highlight the filter to edit in the *Filter Order* box.
   Note Default filters cannot be edited.
3. Edit the desired Filter criteria.
4. Click the **Save Filter** button.

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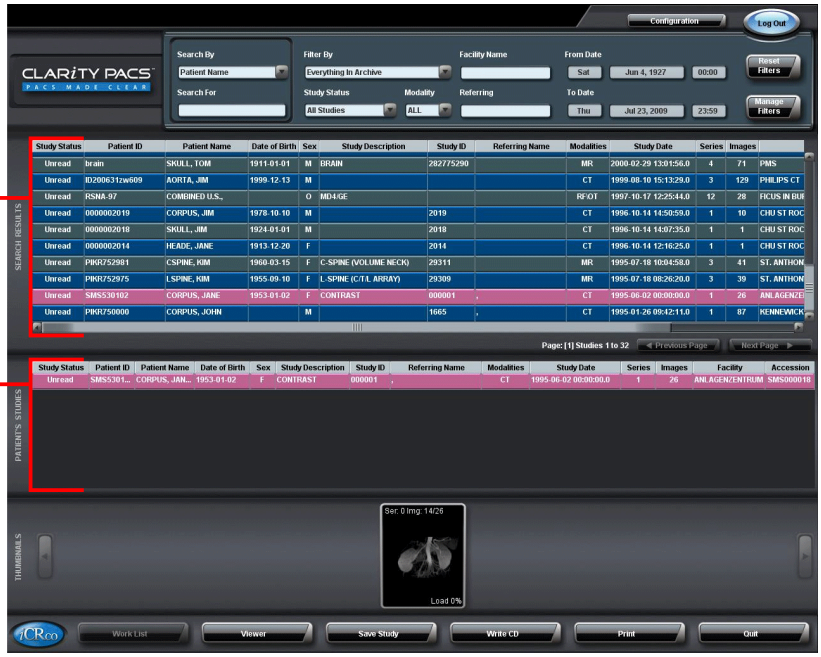
3.3 Work List



3.3.1 Sorted Studies

Sorted Studies appear below the Search Keys & Filters. Sorted Studies show the studies that match the criteria specified in the Search Keys & Filters.

3.3.2 Grouped Studies

Note The Grouped Studies work list will only appear with screen resolutions of 1280 x 1024 or above.

Grouped Studies appear below the Sorted Studies. The Grouped Studies show all the studies from a patient selected in the Sorted Studies Work List.

3.3.3 Thumbnails

The thumbnail previews are shown at the bottom of the screen when a study is selected in either the Sorted Studies or Grouped Studies Work List.

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3.3.4 Viewing Selected Studies

From the Work List: To view a selected study, the User may double click the desired study in the Sorted or Grouped Studies, or the User may double click the preview thumbnail at the bottom of the Work List.

From the Image Viewer window: To view a selected study, mouse over the bottom part of the window to reveal the thumbnails associated with the study, then drag and drop the desired image into the image manipulation window and the image will load.

3.4 Image Layout and Navigation

Moving the mouse to the left hand side of the screen will make the tool bar appear so that the User can select the necessary image manipulation tool.

Moving the mouse to the bottom of the screen will make the thumbnails associated with the study appear. To load a different image into the image manipulation window, drag the thumbnail into the image manipulation window and it will automatically load.

3.4.1 Frequently Used Tools

The Clarity Viewer keeps track of how often tools are used, and the most frequently used tools populate the bottom area of the tool bar, giving the User quick and easy access to their most used tools. The User may set the number of frequently used tools by going to *Configuration* → *Tools* tab. In the Tools tab, the User may also reset the frequently used tools count, which will clear all the tools from the frequently used tools section of the tool bar. The User may also remove one tool at a time from the frequently used tools section by Ctrl + Alt + mouse clicking on the tool in the tool bar.

3.4.2 Locking the Tool bar

The User has the option to make the tool bar always visible. Clicking the **Lock** button at the bottom of the tool bar will cause the tool bar to be always visible. Deselecting the button will return the tool bar to its hidden state.

3.4.3 Default Mouse Actions

When the Viewer window is first opened, the mouse buttons are automatically mapped to image manipulation tools. The mapped mouse button is indicated by a mouse icon on the

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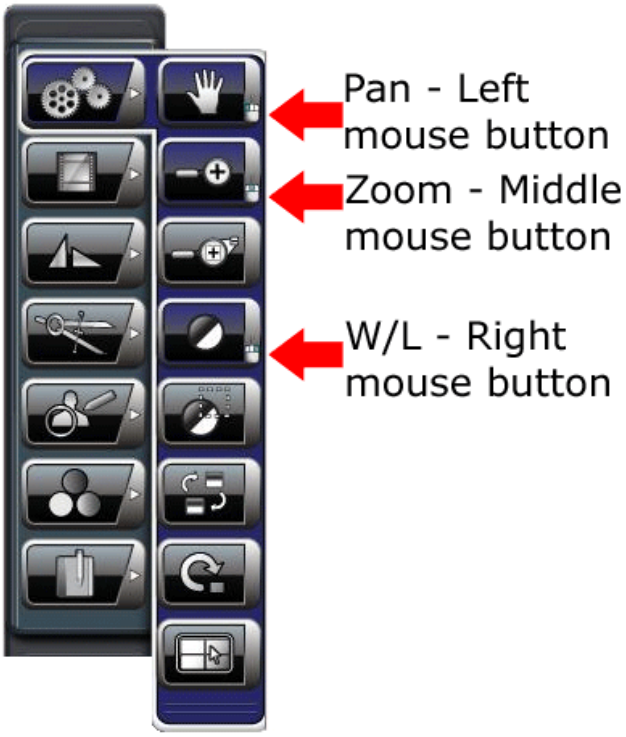
upper, right-hand corner of the tool's icon (illustrated in the graphic below). The default mapped mouse buttons can be changed. See Section 2.6.9 for more information.

Holding down the right mouse button and moving it vertically on the screen will adjust the brightness of the image. Holding down the right mouse button and moving it horizontally on the screen will adjust the contrast of the image.

Holding down the left mouse button and moving the mouse in any direction will allow the User to pan around the image.

If the User has a scroll wheel mouse, moving the scroll wheel up will zoom into the image, while moving the scroll wheel down will zoom out.



Each mouse button is re-mappable to any tool that has an interactive function. To re-map a mouse button, move the mouse over the left side of the screen to make the tool bar pop-up. Locate the tool the User wishes to map to the mouse button, move the mouse over that tool, then click the tool with the mouse button the User wishes to map. For example, if the User wishes to map the Mag tool to the right mouse button, move the mouse over the Mag tool button, then right mouse click on the Mag tool button. You will see a small mouse icon appear in the upper right-hand corner of the Mag tool button, this means the User has successfully re-mapped the mouse button. To use the newly mapped Mag button, move the mouse over the image at the point the User wishes to magnify, then right click.

3.4.4 Image Layouts

The image layout tool allows the User to compare two or more images side by side. Clicking on the Image Layout button will pop-up the *Layout Selections* dialog box.

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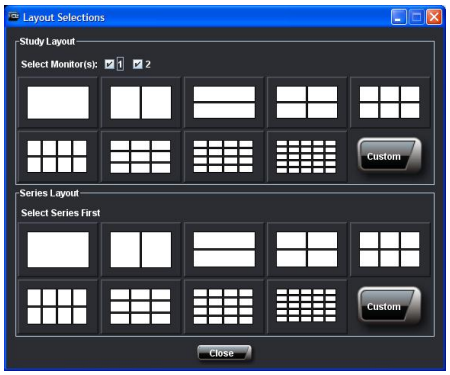
Default Image Layouts

The User may specify, on a per modality basis, the default layout of images in a study. Please see Section 2.6.3 to set this option. If enabled, this preference will override those specified below.

Study Layout

The Study Layout is used to view multiple images on one screen. To use the Study Layouts, first select which monitor to apply the layout selections to (the monitor is select when there is a dashed, white border just inside the image viewing pane). Then select the layout view to use, and the image manipulation window will split into the desired number of panes. Then drag the images from the thumbnail box into the viewing panes. To return to viewing one image, select the monitor to apply the layout to, then click the single box in the upper left hand corner of the *Layout Selections* dialog box.



Series Layout

The Series Layout is used to view multiple images in a series, such as images from the CT or MR modality. To use the Series Layouts, first select the monitor to apply the layout to, then select the layout view to use, and the image manipulation window will split into the desired number of panes. The images in the series will then populate the pane. To return to viewing one image, click the single box in the upper, left-hand corner of the layout selections dialog box. Images of the CT modality will automatically open four viewing panes, and the MR modality will open nine viewing panes. The User may change the number of panes for the CT and MR modality by clicking a different layout view from the Image Layouts dialog.

3.4.5 Next & Previous Image

These buttons move to the next and previous images in the patient study when inside an image manipulating window. The buttons can be revealed by hovering the mouse over the upper, right-hand corner or the image manipulation window. The left and right arrow keys will also advance the User through the images in a series. Hotkey: Right Arrow: Next Image, Left Arrow: Previous Image.

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3.4.6 Next & Previous Series

These buttons move the User to the next and previous series in a study. The buttons can be revealed by hovering the mouse over the upper, right-hand corner or the image manipulation window. The up and down arrow keys will also advance the User through the series in a study. Hotkey: Up Arrow: Next Series, Down Arrow: Previous Series.

3.4.7 Zoom

The Zoom tool is used to increase or decrease the magnification of the image. By default, it is mapped to the middle mouse button. To use the Zoom tool, first select it from the tool bar, then mouse over the image. Click, hold, and move the mouse vertically to change the zoom level. Hotkey: Z

3.4.8 Pan

The Pan tool allows the User to move the image around the screen. This is especially useful if the User is zoomed into an image and needs to view another section of the image. By default, the Pan tool is mapped to the left mouse button. To use the Pan tool, first select it from the tool bar. Then move the mouse over the image. Click and hold down the mouse button, then move the mouse in the desired direction to pan. Hotkey: P

3.5 Image Manipulation Functions

3.5.1 Window/Level

The Window/Level tool allows the User to adjust the brightness and contrast of the image. By default, this is mapped to the right mouse button. To use the W/L tool, first select it from the tool bar. Then hold down the mouse button and move the mouse horizontally to adjust the contrast of the image and move the mouse vertically to adjust the brightness of the image. Hotkey: W

3.5.2 Smart Window/Level

The Smart Window/Level tool allows the User to do an automatic Window/Level optimization determined by a user-selectable box. To use the Smart W/L, select the tool from the tool bar, then click, hold, and drag to draw the box. Release the mouse button when the box is a sufficient size. The box will optimized the W/L setting for the selected area.

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3.5.3 Mag

The Mag tool allows the User to temporarily magnify part of the image. To magnify a part of the image, first select the Mag tool from the tool bar. Mouse over the image, then click and hold the mouse button. A box will appear with the magnified section of the image. While holding down the mouse button, the User can use the up and down arrow keys to increase or decrease the magnification inside the box, and the left and right arrow keys to increase the size of the magnification box. Hotkey: G

3.5.4 Reset

The Reset button will return the image to the state it was in when it was opened. It will remove any Window/Level, Zoom, Invert, and Rotation manipulations done to the image. It will not, however, remove annotations on the image. To use the Reset tool, locate it in the tool bar, then click it once to reset the image.

3.5.5 Flip

The Flip tool will vertically invert the image. To use the Flip tool, locate it in the tool bar, then left mouse click once to flip the image.

3.5.6 Mirror

The Mirror tool will horizontally invert the image. To use the Mirror tool, first locate it in the tool bar, then left mouse click once to mirror the image.

3.5.7 Rotate Left & Right

The Rotate Left and Right tools will rotate the image in 45 degree increments to the left or right depending on which button the User chooses.

3.5.8 Invert

The Invert tool will invert the colors of the image. To use the Invert tool, first locate it in the tool bar. Then single mouse click to invert the image.

3.6 Cine Tools

3.6.1 Loop Forward

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The Loop Forward tool will play back, in a cinematic style, a series with multiple images from the first image to the last image and continue to play them until it is halted.

3.6.2 Loop Backward

The Loop Backward tool will play back, in a cinematic style, a series with multiple images from the last image to the first image and continue to play them until it is halted.

3.6.3 Cine Forward & Back

The Cine Forward & Back tool will play back, in a cinematic style, a series with multiple images from the first through the last image, then from the last image to the first and continue to play them until it is halted.

3.6.4 Pause/Play

The Pause/Play tool will pause the play back from the Loop Forward, Backward, and Forward & Back tools.

3.6.5 Frames Per Second Selection

The Frames Per Second (FPS) slider allows the User to adjust the play back rate for the Loop Forward, Loop Backward, and Forward & Back tools.

3.6.6 Scroll

The Scroll tool allows the User to scroll through a series of images. To use the scroll tool, first select it from the tool bar. Then mouse over the image and move the mouse vertically. Hotkey: S

3.6.7 X-Ref

The X-Ref tool allows the User to show cross-reference lines on two overlapping, anatomic views from the same study. To use the X-Ref tool, first select it in the tool bar. Then click on the image that the User wants cross-referenced, and the cross-reference lines will appear. Hotkey: X

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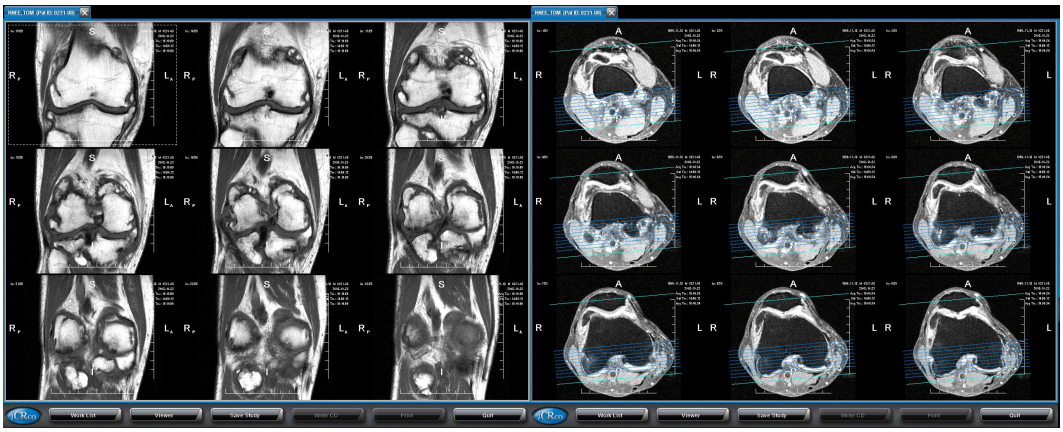

Figure 3.1: Cross-references lines in the Clarity Viewer

3.6.8 Linking

The Linking tool allows the User to apply the cine operation to two different series that were acquired using the same view. To use the Linking tool, first select it from the tool bar. Then click on the on one frame of the study that is to be linked. Use the cine play-back tools to play both series at the same time. Hotkey: L

3.7 Measurements

3.7.1 Measurement

The Measurement tool allows the User to make a linear measurement directly on the image. To use the Measurement tool, first select the tool from the tool bar, then mouse click and hold at the point where the measurement starts, then while holding the mouse button, drag the mouse to the end point of the measurement and release the mouse button. While dragging, the User will see the measurement. You can move the measurement around the image by selecting it (the User will know the measurement is selected when four dots show up around the measurement), then dragging it around the screen. To remove the measurement, select it and hit the Backspace key. Hotkey: M

3.7.2 HU

The HU tool, or Hounsfield Unit, will convert the gray scale value on the image to a pixel value/Hounsfield Unit. To use the HU tool, first select the tool from the tool bar, then move the mouse to the desired area and click. A cross will appear with the measurements directly above it. Hotkey: H

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3.7.3 HU ROI

The HU ROI tool, or Hounsfield Unit Region of Interest, will take a selected region, average the gray scale unites for the region, then convert the average gray scale unit into a Hounsfield Unit. The tool will display the Hounsfield Unit measurement, the standard deviation of the pixel value, and the area of the circle in cm^2. To use the HU ROI tool, first select it from the tool bar. Then click, hold, and drag out the box. Release the mouse button when the HU ROI box is the desired size. Hotkey: R

3.7.4 Angle

The Angle tool allows the User to measure angles on an object in the image. The Angle tool is able to display the interior or exterior measurement of the angle. To use the Angle tool, first select it from the too bar, then move your mouse to where the vertex of the angle will be, mouse click, hold, and drag out one leg of the angle. When the length of the leg is satisfactory, release the mouse button. The second leg of the angle is drawn by moving the mouse to the desired end point of the second leg and mouse clicking. This will set the angle. If the User wishes to display the interior angle measurement, move the mouse to the acute side of the angle and mouse click, or if the exterior measurement is necessary, move the mouse to the obtuse side of the angle and mouse click.

3.7.5 Cobb Angle

The Cobb Angle tool allows the User to draw a Cobb Angle on the image. To use the Cobb Angle tool, first select it from the tool bar, then mouse-click, hold, and drag to draw the first line. Release the mouse button when the first line is sufficiently long. Then mouse click, hold, and drag to draw the second line. Release the mouse button when the second line is sufficient in length. To set the interior or exterior measurement, mouse over the acute or obtuse side of the Cobb Angle, and mouse click again. The measurement will appear.

3.7.6 Center Line

The Center Line tool allows the User to annotate, in four different methods, a center line or point on the image. The User may select the Center Line annotation type by navigating to the *Work List window* → *Configuration* → *Tools* tab. To use the Center Line tool, first select it from the tool bar, then:

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Two Points no Line (click and drag)

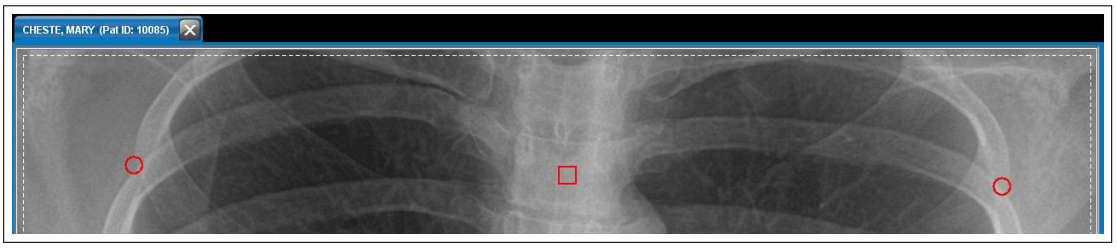

Figure 3.2: Center Line Tool: Two Points Without a Line

To use the Center Line tool with two points and no line, mouse click at the desired start point, hold, and drag the Center Line annotation to the desired length. When the Center Line is correctly positioned, release the mouse button. The square indicates the center point between the two circles.

Two Points with Line (click and drag)

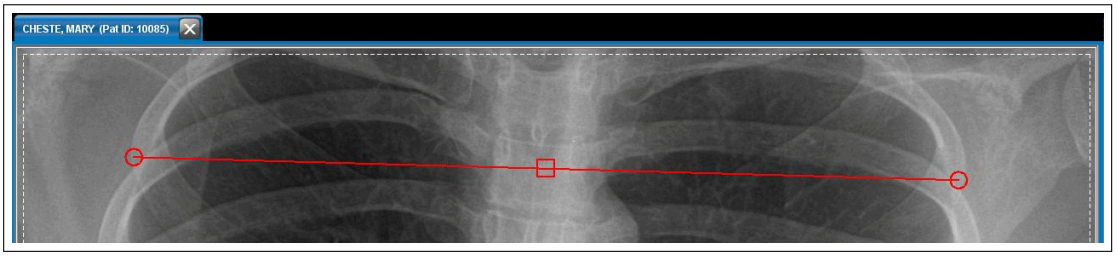

Figure 3.3: Center Line Tool: Two Points With a Line

To use the Center Line tool with a line, mouse click at the desired start point, hold, and drag the Center Line annotation to the desired length. When the Center Line is correctly positioned, release the mouse button. The square indicates the center point between the two circles with a straight line passing through all points.

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Four Points

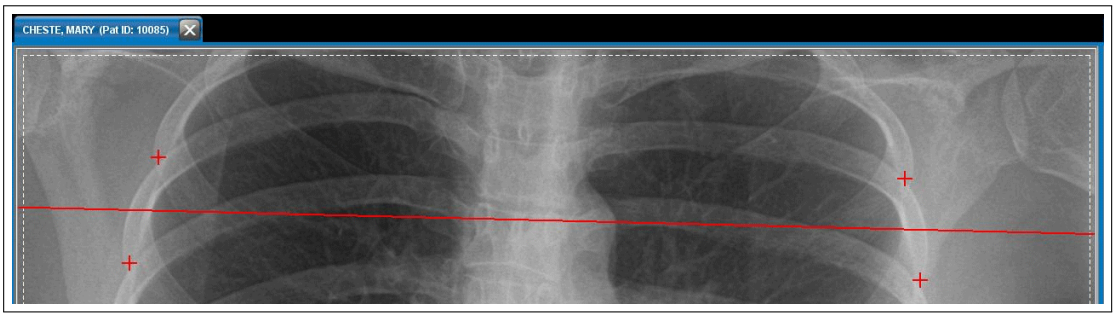

Figure 3.4: Center Line Tool: Four Points With a Line

To use the Center Line tool with four points, mouse click at each of the desired points. The four point version of the Center Line finds the center point between the first set of two clicked points, and the center point between the second set of two points, then draws a line through the two center points.

Eight Points with Angle

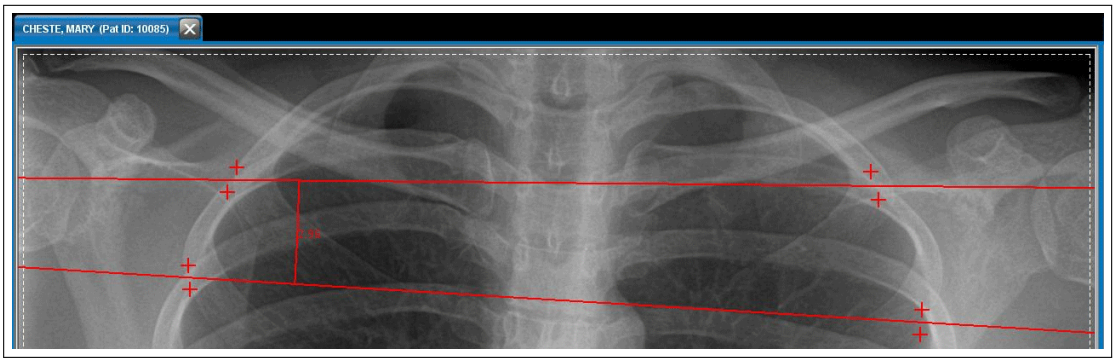

Figure 3.5: Center Line Tool: Eight Points With an Angle

To use the Center Line tool with eight points and an angle, mouse click at the first four desired points. The Center Line finds the center point between the first set of two points, and the center point between the second set of two points, then draws a line through the two center points. Repeat the process for the second set of four points and the angle of the two intersecting lines will be shown.

3.7.7 Heart to Lung Ratio

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The Heart to Lung Ratio tool allows the User to find the ratio of the heart to lung size. To use the Heart to Lung Ratio tool, first select the it from the tool bar, then use the mouse to click, hold, and drag the fir the first measurement, then release the mouse. Use the mouse again to mouse click, hold and drag for the second measurement. Release the mouse button when the length is satisfactory. The ratio of the two measurements will be displayed automatically.

3.8 Annotations

3.8.1 Toggle Annotations

The Toggle Annotations tool allows the User to hide and show annotations & measurements. To hide annotations, locate it in the tool bar, then click the **Toggle Annotations** button. Note that new annotations cannot be drawn while the annotations are hidden. To show the annotations, click the **Toggle Annotations** button again.

3.8.2 Text Arrow

The Text Arrow tool allows the User to draw an arrow point at a region of interest and add text to the tail end of the arrow. To use the Text Arrow tool, first select the tool, then mouse click and hold where the end of the arrow will be. While still holding the down the mouse button, drag the mouse to where the arrow head will be, then release the mouse button. After releasing the mouse button, a dialog box will pop up asking for the text. Enter the desired text, click **Ok**, and the text will appear at the tail end of the arrow. Hotkey: U

Note For an arrow without text, do not enter any text into the text field dialog box. Press **Ok** or **Cancel** with the text field empty, and no text will be drawn on the arrow.

Note The User may switch the arrow drawing direction in the preferences.

3.8.3 Line

The Line tool allows the User to draw lines on the image. To use the Line tool, first select the tool, then mouse click and hold where the User want the line to being, then, while still holding the mouse button, drag out the line. Release the mouse button when the User want to end the line.

3.8.4 Circle

The Circle tool allows the User to draw circles or ellipses on the image. To use the Circle tool, first select the tool, then mouse click and hold where the User want the circle to begin, and while still holding the mouse button, drag the circle out to

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encompass the region of interest. When finished, release the mouse button to finalize the circle.

3.8.5 Text

The Text tool allows the User to add text notes to the image. To use the Text tool, first select the tool, then mouse click where the text should appear. A dialog box will appear. Enter the desired text and click **Ok**. The desired text will appear where the mouse was clicked. Hotkey: T

3.8.6 Overlay

The Overlay tool toggles the amount of information displayed on screen. With this tool the User can display different levels of information about the image. To use the Overlay tool, locate the it in the tool bar, then click the **Overlay** button. There are three different levels of information that can be displayed, so the User can click the Overlay button several times to display different amounts of information.

3.9 Filters

3.9.1 Sharpen

The Sharpen tool allows the User to apply a standard image sharpening filter to the image. To use the Sharpen tool, locate it in the tool bar and click it. Depending on the size of the image, it may take a few seconds before results are seen.

3.9.2 Histogram Equalization

The Histogram Equalization tool allows the User to apply a histogram equalization filter to the image. The Histogram equalization tool takes an image that has most of the usable data represented within a close contrast range and "spreads out" this data over the available grayscale values to improve contrast visibility. To use the Histogram Equalization tool, locate the **Histogram Equalization** button in the tool bar and click it. Depending on the size and bit-depth of the image, it may take a few seconds before results are seen. The User may need to re-window/level after applying a histogram equalization.

3.9.3 Undo

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The Undo tool reverses the action of the previous Sharpen or Histogram Equalization filter.

3.9.4 Redo

The Redo tools reapplies the last filter that was reverted using the Undo tool.

3.10 Reporting Tools

Note No annotations or manipulations (W/L, Pan, Zoom, Arrows, etc.) will be included on images in reports. The Reporting Tools are a suite of functions designed to allow the Users to share, view, print and send reports from the Clarity Viewer.

Key Images in Reports

Users may include images in reports. To include images in reports, first load the desired images. Then press *K* key on the keyboard. A key icon will appear in the upper, left-hand corner of the image which identifies that the image has been marked as a key image. Next locate the **Write Report** button in the tool bar and continue to write the report. When the report is generated (after clicking the **Create** button) the key images will be included. There is no limit on how many images are included in the report. Users may also add key images when making addenda/corrections.

Writing a Report

To write a report open an image for viewing then click the **Write** button in the tool bar. The Report Writer dialog will appear. Enter the necessary information for the report, then click **Create**. The report will automatically be generated and saved alongside the image for viewing.

Note Only Users with "doctor" privileges are able to write reports. If your permissions are not set correctly, please contact your System Administrator.

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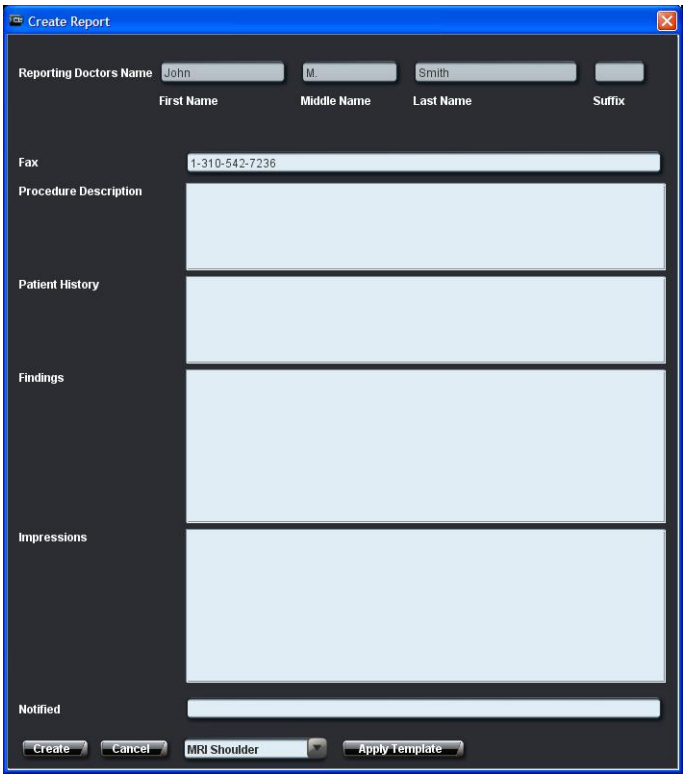
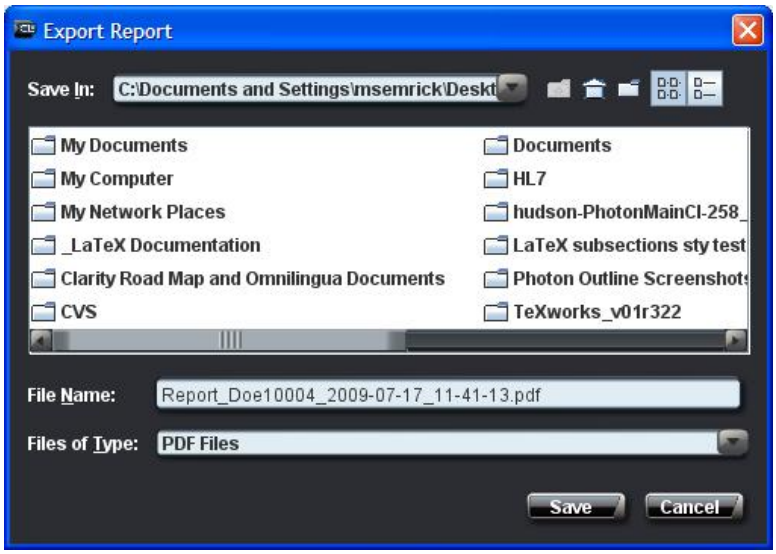


Viewing a Report

Viewing a report is the same a viewing an image. Locate the report in the *Thumbnails* pop-up, then drag the report onto the screen and it will load automatically.

Exporting a Report



To export a report to the local hard drive for printing, archiving, or other purposes, click the **Export Report** button in the tool bar. A dialog will pop-up asking for the save location. Select a location, then click **Save**. The report will be saved to the location the User chooses. The report can then be opened using any PDF viewer.

Addenda/Corrections

After the initial report is made on the Patient Study (the Clarity Archive only permits one report per study), the doctor may make addenda/corrections to the report by opening the patient study to which the report is attached. Click the **Write Report** button. The *Create Report Addendum* dialog will pop-up. Select the radio dialog box for either Addendum or Correction, then type the addendum or correction into the text box. Click **Create** button and the addendum/correction will be appended to the bottom of the report.

Report Templating

The Report Writer tool includes a templating feature for writing a report.

Creating a New Report Template

1. In the tool bar, click the **Write Report** button.
2. Fill in the desired fields for the template. The User does not have to fill out all fields. For example, the User could fill in only the *Fax* and *Notified* fields.
3. In the drop-down menu next to the Apply Template button, select **Create New**.

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4. Click the **Apply Template** button.
5. Assign a name to the new template, then click **Ok** to save the new template.

Applying a Report Template

1. In the tool bar, click the **Write Report** button.
2. In the drop-down menu next to the Apply Template button, select the desired template.
3. Click the **Apply Template** button.
4. The template will populate the Report text boxes.

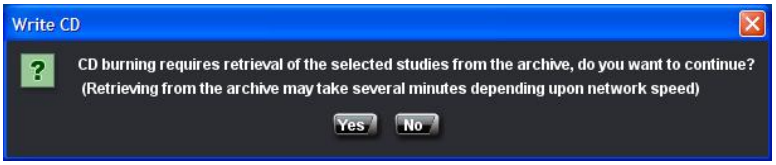
Deleting a Report Template

1. In the tool bar, click the **Write Report** button.
2. In the drop-down menu next to the Apply Template button, select **Delete**.
3. The *Delete* dialog will pop-up.
4. Select the template to delete from the drop-down menu.
5. Click **Ok** to delete the template.

3.11 Burning a CD/DVD

1. In the Work List, select the desired patient(s). The User may simultaneously hold down the Ctrl key and left mouse click to select multiple patients.
2. Click the **Write CD** button

3. Click **Yes** to retrieve the studies.


Write CD
CD burning requires retrieval of the selected studies from the archive, do you want to continue?
(Retrieving from the archive may take several minutes depending upon network speed)
Yes
No

4. Please be patient, depending on the speed of the network and the number of patients selected, retrieving the studies could take a few minutes.
5. The export dialog will pop up once the studies have been retrieved. To burn the studies to a CD/DVD, select the burner attached to the system in the export dialog, then click **Export** button. If the User wants an embedded image viewer on the CD,

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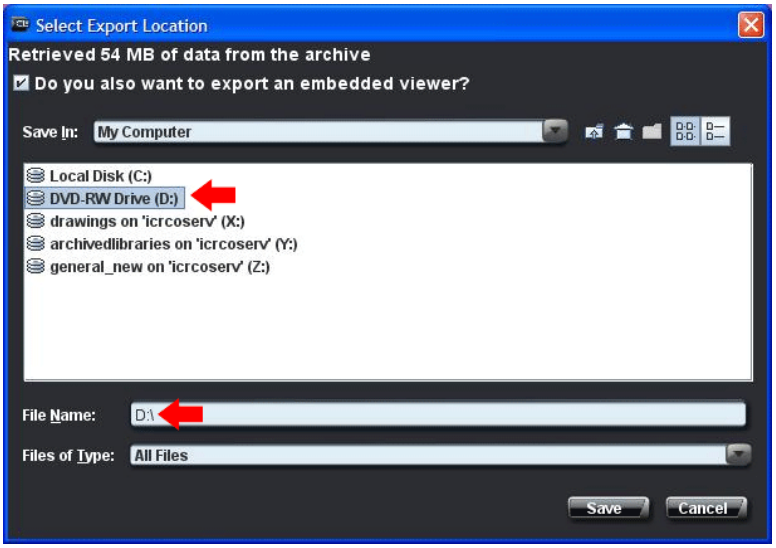
check the appropriate box at the top of the export dialog. If the User wants to export the studies to the local file system, then select the desired folder for export.



6. Please be patient as the files export. The *Quit* button will be grayed out while the CD/DVD burns, as the User may not exit the Viewer until the burning has finished. Once the disk is done burning, it will automatically eject from the drive.

3.12 Saving a Study

3.12.1 Saving a Study from the Image Viewer window

Notice Only one GSPS per study is allowed. GSPS information is always overwritten when saving new annotations.

While in the Image Viewer window, the *Save Study* button is used to save the current study. Clicking the *Save Study* button when in the Viewer window will save the following attributes: current Window/Level settings, Annotations, Image Rotation, and Image Flip. Saved states are automatically loaded when the series is opened.

3.12.2 DICOM Sending a Study from the Work List window

While in the Work List window, the **Save Study** button is used to DICOM Send to another system's target.

Setting Up a DICOM Target:

1. While in the *Work List* window, highlight the desired patient(s) to send.

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2. Click the **Save Study** button. The *DICOM Send* dialog will pop-up.
3. Select the *Configuration* tab.
4. Enter the new AET Title, IP Address, and Port Number of the DICOM Target.
5. Click the **Save** button. The Clarity Viewer will automatically test the new parameters to make sure there is a valid DICOM connection.
6. If the connection is valid, the *Save AET* dialog will appear. Give the new DICOM target a meaningful name, then click **Ok** to save the new target.

DICOM Send:

1. While in the *Work List* window, highlight the desired patient(s) to send.
2. Click the **Save Study** button. The *DICOM Send* dialog will pop-up.
3. Select the desired profile to send to from the *Profile Name* drop-down menu.
4. Click **Send** to DICOM Send the selected study.

3.13 Clarity Viewer Hotkeys

Note When using hotkeys to navigate the tools, the tool will always be mapped to the left mouse button.

Keyboard Shortcut	Software Function
Escape	Remove all image manipulations (W/L, Zoom, Pan)
F1	Show Online Help Documentation
F2	Brings up CR Overlay Details Dialog
F3	Pauses/Un-pauses Series Loading State
F4	Query/Retrieve Selected Study
F5	View Selected Study
Right Arrow	Next Image in a Series
Left Arrow	Previous Image in a Series
Up Arrow	Next Series in Study
Down Arrow	Previous Series in Study
W	Window / Level Tool
Z	Zoom
P	Pan
G	Magnify
D	Drag and Drop
S	Cine Tools Scroll
X	Cine Tools X-Ref
L	Cine Tools Linking

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M	Measure
H	Hounsfield Unit
R	Hounsfield Unit Region of Interest
K	Mark Key Image
T	Text Annotation
U	Text Arrow Annotation
C	Clear All Annotations
Backspace/Delete	Delete Selected Annotation
Ctrl + A	Select All Annotations
Ctrl + C	Copy Selected Information to Clipboard
Ctrl + Alt + Mouse Click	Remove tool from Frequently Used Tools list

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4. DICOM Printing

4.1 Print Workflow

1. Open the desired patient from the Worklist.
2. Use the **Layout Manager** to layout the images as desired.
3. Perform the desired image manipulations (Window/Level, crop, zoom, etc.)
4. Click the **Print** button to enter Print Mode.
5. Select the desired printer, film size, film type, and orientation.
6. Set the desired number of copies.
7. If the desired annoations are different from the defaults, set the desired annotations by clicking the **Annotation Menu** button and choosing the desired options.
8. Click the **Preview** button to ensure that the image layout is correct.
9. Click the **Print** button to print the films.

   When the images have been sent to the printer, Print Mode will close.

4.2 Configuring Default Print Options

The User can configure the default print options by going to **Configure** → **Printing**.

Click the **Apply** button to save the default print options.

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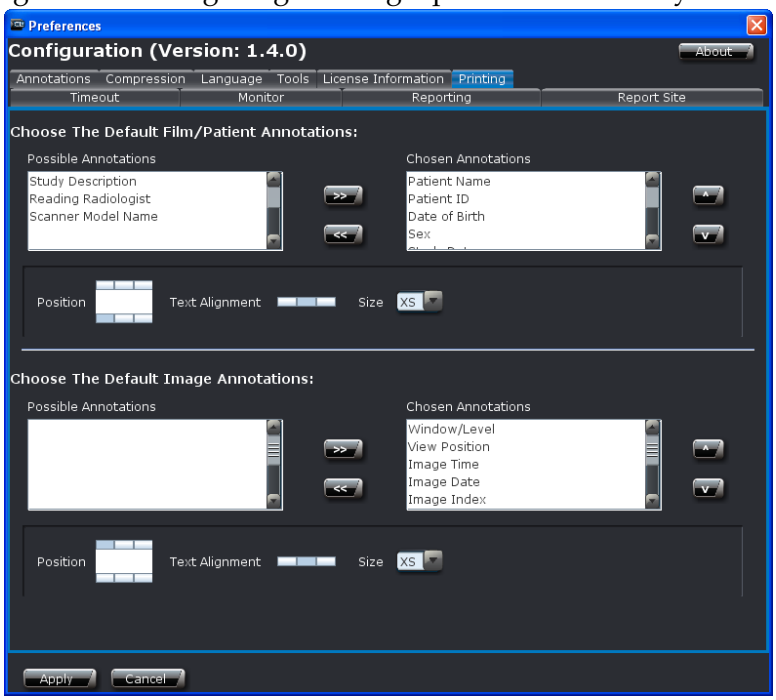
Figure 4.1: Configuring Printing Options in the Clarity Viewer



From here, the User can:

- Choose which Film/Patient and Image Annotations to include.
- Choose the order in which Annotations are printed.
- Choose the position of the Annotations (top or bottom; left, center, or right).
- Choose the font size (extra small, small, medium, larger, or extra large).

4.3 Entering Print Mode

Before entering Print Mode, the User must select the correct image layout and add the desired annotations. The User can then enter Print Mode by clicking the **Print** button.

4.4 Image Layout and Annotations

Annotations and image layout are performed in the Clarity Viewer's Image Manipulation window. The image annotations and layouts are then automatically transferred over when the Print button is clicked.

For more information on printing multiple images per film, see Section 3.4.4.

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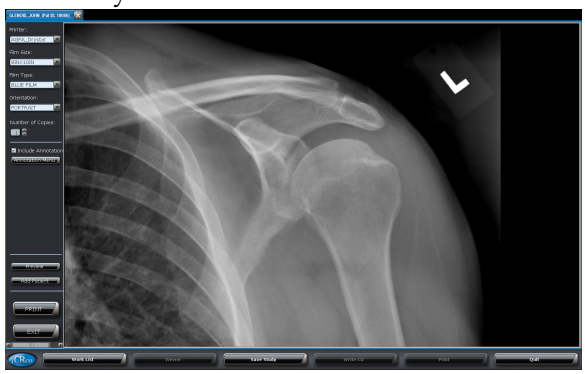
For more information on adding annotations, see Section 3.5.

4.5 Print Options

After entering Print Mode the User can access the Print toolbar which allows the User to choose the Print Options.

Figure 4.2: Clarity Elements DICOM Print Tool's Print toolbar



In the Print toolbar, the User can:

1. Select the printer to use.
2. Select the film size.
3. Select the film type.
4. Select the film orientation (landscape or portrait).
5. Select the number of copies to print.
6. Turn on/off annotations.
7. Select which annotations to include on the film (if the User needs to include or exclude options different from the defaults).
8. Preview the print job.
9. Add a different patients' image to the same film.
10. Print the film(s).
11. Exit Print Mode.

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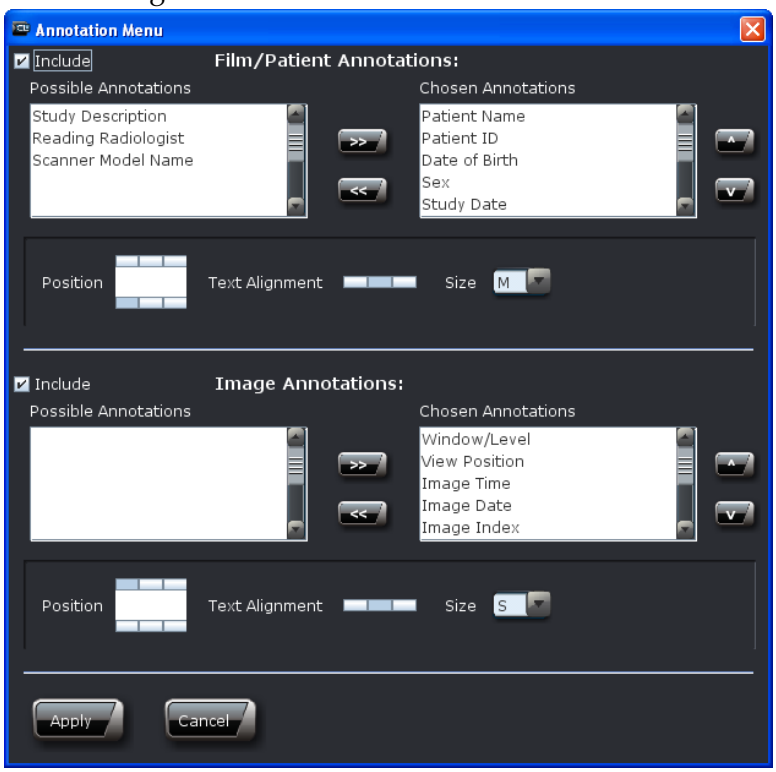
4.5.1 Annotation Menu

The User can configure the which annotations to include on the film by clicking the **Annotation Menu** button in the Print toolbar.

Click the **Apply** button to save the default print options.

Figure 4.3: Print Tool's Annotation Menu



From here, the User can:

- Choose which Film/Patient and Image Annotations to include.
- Choose the order in which Annotations are printed.
- Choose the position of the Annotations (top or bottom; left, center, or right).
- Choose the font size (extra small, small, medium, larger, or extra large).

4.5.2 Using the Image Index

The Image Index feature is used to print multiple images from a series, over multiple films, in a user-definable layout.

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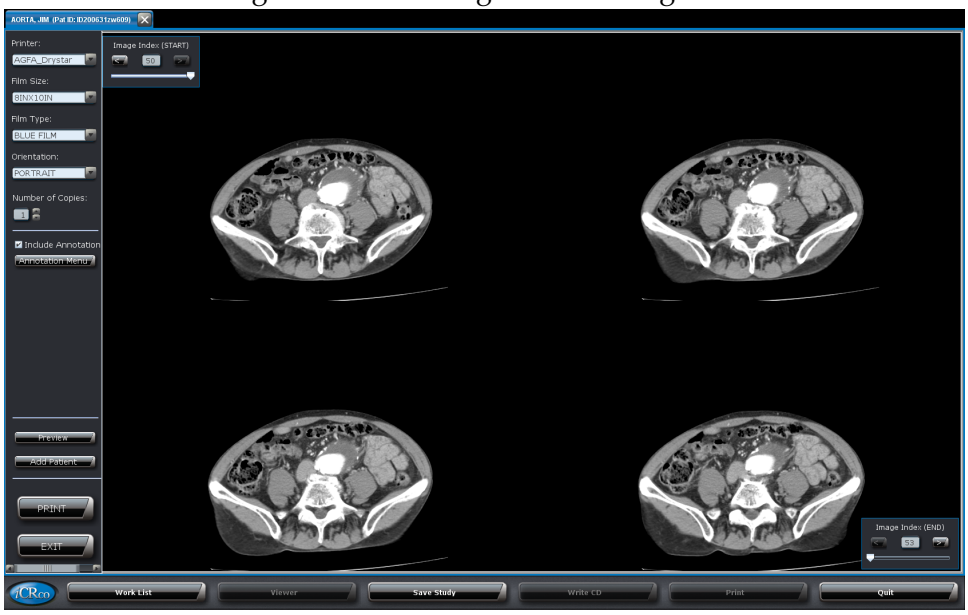
The Image Index dialog box appears in the upper left and lower right-hand corners of the image when in Print Mode and a series with multiple images is selected (See Figure 4.4).

Figure 4.4: The Image Index dialog boxs



Example Usage

The series to print is a CT series with 16 images. The Physician has indicated that the series should be printed with four image per film. To print this series using the Image Index feature:

1. Open the series.
2. Use the Layout Manager to change the image layout to four (4) viewing panes.
3. Click the **Print** button to enter Print Mode.
4. Ensure the **Image Index (START)** is set to one (1) and **Image Index (END)** is set to 16.
5. Click the **Preview** button to preview the print job.
6. Move the Print Preview slider to the right to ensure all image have been laid out properly. In the print preview, there should be four films with four images per film.
7. Click the **Print** button to print the films.

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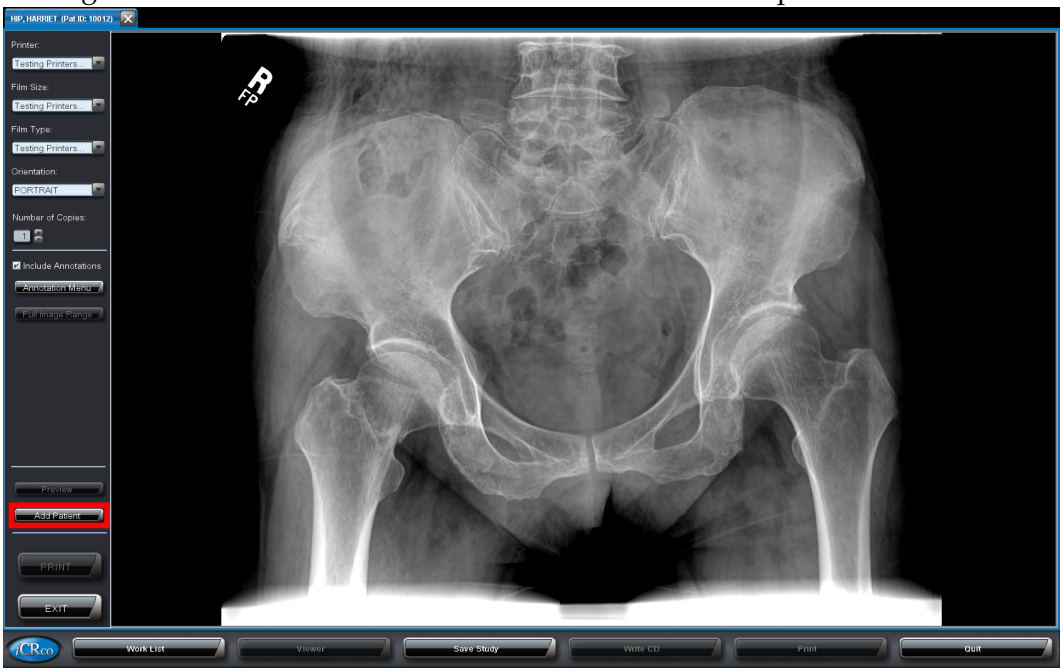
4.6 Printing Multiple Patients per Film

The User can print more than one patient per film by using the **Add Patient** button (Figure 4.5) in the Print toolbar.

Figure 4.5: Click the **Add Patient** button to add another patient to the film



1. Enter Print Mode by clicking the **Print** button.
2. In the **Print** toolbar, click the **Add Patient** button.
3. Locate the patient to add:
   - If the patient's study is already open in a tab, navigate to the tab, then click the **Add Patient to Print** button.
   - If the patient's study is not open, navigate to the **Work List**, open the desired patient, then click the **Add Patient to Print** button.
4. Click the **Preview** button in the Print toolbar to confirm the print layout.
5. Click the **Print** button to print the images.

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A. Appendix

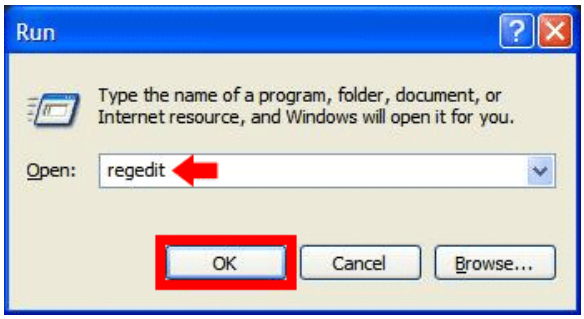
A.1 Clearing the Java Cache

1. Go to *Start* → *Control Panel* → *Java*.
2. Locate the *Temporary Internet Files* section. Click the **Settings** button.
3. Click the **Delete Files** button.
4. Make sure *Applications and Applets* and *Trace and Log Files* are both checked, then click **Ok**.
5. Re-deploy the Clarity Viewer by following the instructions in Section 2.3.1.

A.2 Setting the Display Back to the Default Using Regedit

If the monitors are not displaying properly, the User should reset them to their default state.
⚠ WARNING Improper editing of the Windows Registry may result in a non-functioning system and/or loss of data. Making regular data back-ups is the only way to ensure data integrity. *i*CRco assumes no liability for lost or corrupted data while following these instructions.

1. Go to *Start* → *Run*.
2. In the *Run* dialog, enter `regedit`, then click **Ok**.



3. Regedit will open open.

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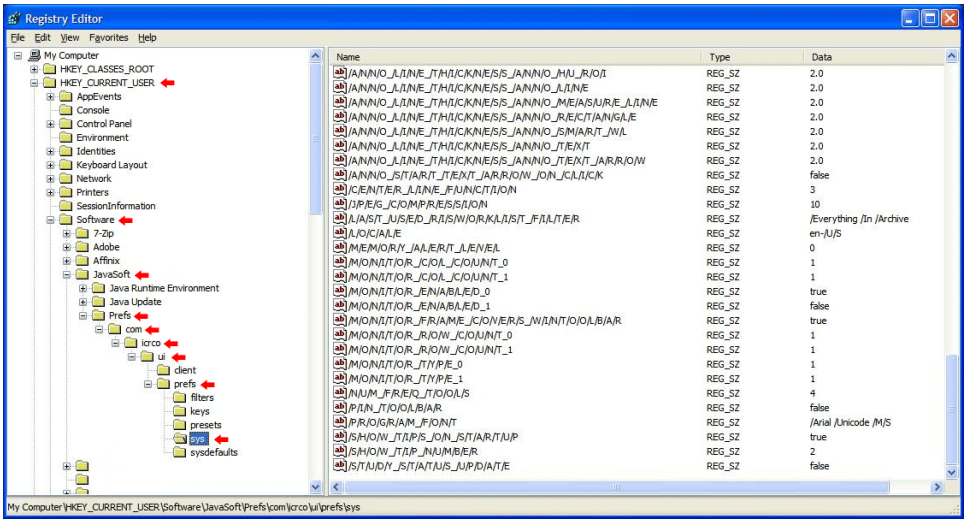
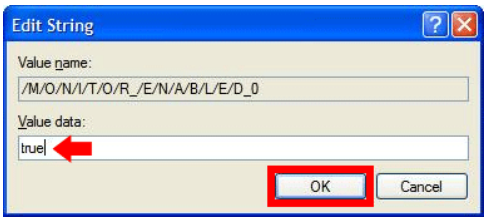
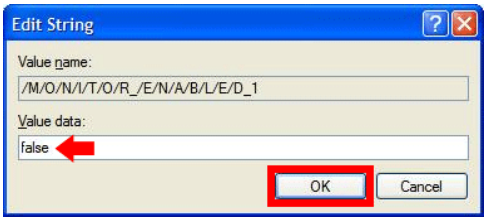
4. In the file tree on the right side of Regedit, go to *HKEY_CURRENT_USER* → *Software* → *JavaSoft* → *Prefs* → *com* → *icrco* → *ui* → *prefs* → *sys*.



5. Locate the string `/M/O/N/I/T/O/R_/E/N/A/B/L/E/D_0`, double click the string and set the *Value Data* to `true`.



6. Any subsequent monitors attached to the system and detected by Clarity will have a string like: `/M/O/N/I/T/O/R_/E/N/A/B/L/E/D_1`. Locate the rest of the monitor strings and set their *Value Data* to `false`. Click **Ok** to save the changes.



7. On the next launch of the Clarity Viewer, the primary Windows monitor should be the only monitor Clarity uses. From this point, the User may log into Clarity and re-configure the monitors, as described in Section 2.6.2.

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